CLAIMS

What is claimed is:

1. A conformal end-fire antenna, comprising:

a high impedance ground surface structure, comprising an array of metal protrusions on a metal sheet, the metal protrusions arranged in a two-dimensional lattice;

an array of wide band flared notch radiating elements positioned adjacent the ground surface structure.

2. The antenna of Claim 1, wherein the ground surface structure is a magnetic conductor surface at an RF frequency band of interest, said ground plane structure functioning as a D.C. short and as a mirror which reflects an RF field in said frequency band with virtually no phase reversal.

3. The antenna of Claim 1, wherein the protrusions form a very thin layer of a densely packed two-dimensional (2-D) periodic structure on top of a conducting surface, the periodic structure shielding the conducting surface underneath from inducing an image current to cancel the propagating E-field.

4. The antenna of Claim 1, wherein the array of metal protrusions are formed as metal plates connected to the metal sheets by vertical posts.

5. The antenna of Claim 4, wherein the metal plates have a hexagonal shape.

6. The antenna of Claim 1, wherein said array comprises a plurality of radiating elements arranged end-to-end along a common end-fire axis and spaced apart

along the axis by a separation distance, each element comprising a flared notch radiating element.

7. The antenna of Claim 6 wherein the array further includes a true-time-delay corporate feed network connected to the radiating elements, wherein time delay differences in contributions by the individual radiating elements to a composite array signal due to the separation of the elements along the axis are equalized by the corporate feed network.

8. The array of Claim 7 wherein the radiating elements are spaced along the axis by one-quarter wavelength at a center frequency of operation for the array, and the array provides an end-fire beam in only one direction along the axis.

9. The array of Claim 6 wherein the radiating element includes a pair of flared dipole wings.

10. The array of Claim 9 wherein the flared dipole wings of each radiating element are fabricated on a top surface of a dielectric substrate, and a lower surface of the dielectric substrate is adjacent the ground surface structure.

11. A conformal end-fire antenna for mounting on a nose cone of an aerial vehicle, comprising:

a high impedance ground surface structure, including an array of metal protrusions on a electrically conductive sheet, the contour of the sheet conforming to the surface contour of the nose cone, the metal protrusions arranged in a two-dimensional lattice;

an array of wide band flared notch radiating elements positioned adjacent the ground surface structure, said array conforming to said contour; and

a beam-forming network connected to the radiating elements.

12. The antenna of Claim 11, wherein said array comprises a plurality of radiating elements arranged end-to-end along a common end-fire axis and spaced apart along the axis by a separation distance, each element comprising a flared notch radiating element.

13. The antenna of Claim 12, wherein the beam-forming network includes a true-time-delay network, wherein time delay differences in contributions by the individual radiating elements to a composite array signal due to the separation of the elements along the axis are equalized by the corporate feed network.

14. The array of Claim 12 wherein the radiating elements are spaced along the axis by one-quarter wavelength at a center frequency of operation for the array, and the array provides an end-fire beam in only one direction along the axis.

15. The antenna of Claim 14 wherein the radiating element includes a pair of flared dipole wings.

16. The antenna of Claim 15 wherein the flared dipole wings of each radiating element are fabricated on a top surface of a dielectric substrate, and a lower surface of the dielectric substrate is adjacent the ground surface structure.

17. The antenna of Claim 11, wherein the ground surface structure is a magnetic conductor surface at an RF frequency band of interest, said ground plane structure functioning as a D.C. short and as a mirror which reflects an RF field in said frequency band with virtually no phase reversal.

18. The antenna of Claim 11, wherein the protrusions form a very thin layer of densely packed two-dimensional (2-D) periodic structure on top of a conducting surface, the periodic structure shielding the conducting surface underneath from inducing an image current to cancel the propagating E-field.

19. The antenna of Claim 11, wherein the array of metal protrusion are formed as metal plates connected to the metal sheets by vertical posts.